Electronic Pre-Combustion Chamber Injector (ePCi)

Maintenance Solutions for Gas Engines

Existing mechanical check valves often foul due to carbon deposits.

This makes it necessary for Operators to shut down and clean the check valves every 3-6 months to keep the engine operating properly.

A fouled check valve can cause the engine to misfire resulting in high hydrocarbon emissions and potential damage to the engine. In addition, the pre-chamber injection event is mechanically fixed and cannot be optimized for different operating conditions.

Solution and Improvement Made

To address this issue, Siemens Energy has developed a simple, yet Electronic Pre-Combustion Chamber (ePCi) injector, which allows for increased reliability and durability compared to a standard mechanical pre-combustion chamber.

It uses an electro-magnet to force the valve open and closed by spring force instead of relying on the standard pressure differential-based mechanical check valve.

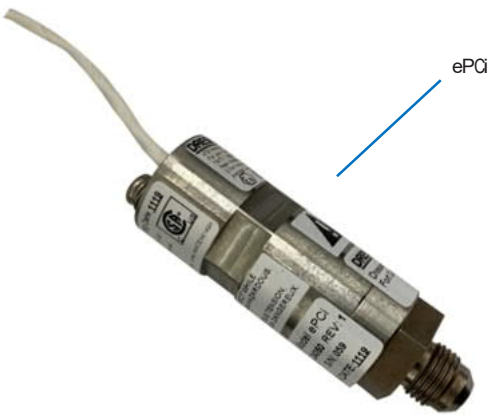
This ePCi system enables control of the start-of-admission and end-of admission events, minimizing contamination during cylinder scavenging and giving precision fuel admission control for improved fuel mixture tuning across all loads and speeds.

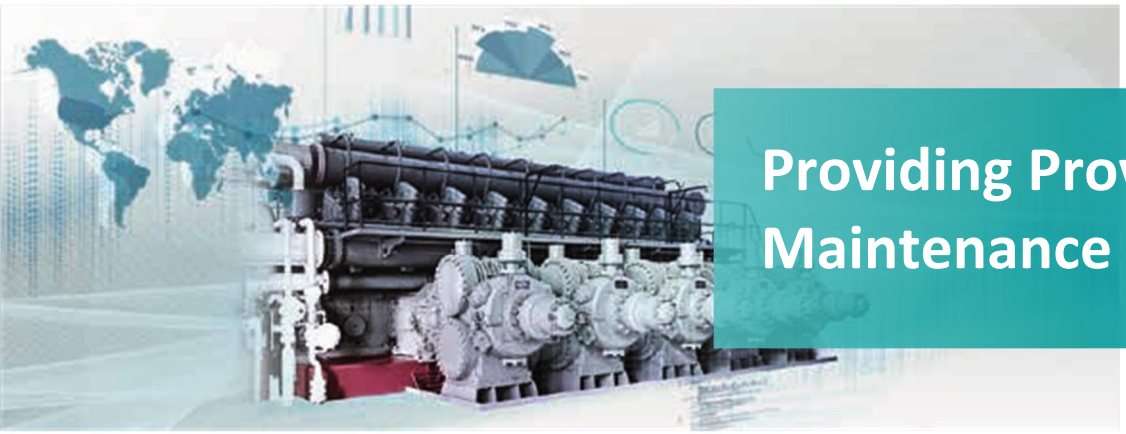
The ePCi control hardware can be fully integrated with existing systems or comes in a standalone sub-panel built to the end users' specific requirements.

Features & Benefits

- Reduces engine component due to reduced misfires or incomplete ignition
- Increased time between maintenance intervals from 3-6 months to 24 months
- Eliminates sticking PCC check valves
- Reduced hydrocarbon emissions
- Easier engine startups
- Precise fuel admission control
- Faster troubleshooting of engine issues
- Saves time of operators and engine analysts due to continuous monitoring of fueling

Manual Check Valve





Providing Proven Maintenance Solutions

Applicability and Technical Descriptions

The product is ideal for slow speed, two and four-stroke integral gas compression engines. In addition, clients with medium speed gas compression engines can benefit from this product.

- Environmental Operating Temperature: -4 to 302° F (-20 to 150° C)
- Gas Supply Pressure: 0 to 100 psig (0 to 689.5 kPa)
- Gas Supply Temperature: -4 to 185° F (-20 to 85° C)
- Gas Quality: pipeline quality natural gas (Gas must contain negligible amounts of H2S)
- **Process Connections:**
  - Inlet: female 7/16-20, -04 Port per SAE J514 Table 11
  - Outlet: male 9/16-18, -06 JIC 37° flare per SAE J514
- Valve Response (assumes the use of Woodward In-Pulse control):
  - Time to full open after signal on: <1.3 msec open response
  - Time to full close after signal off: <1.3 msec closing response
- Minimum Valve Cracking Pressure: 115 psig (793 kPa)
- Forward Flow Seat Leakage: <0.5% of wide open flow at 75 psig
- Reverse Flow Seat Leakage: <0.5% of wide open flow at 500 psig
- Vibration Qualification Test: US MIL-STD-810C method 514.2, curve F
- Built-in Last Chance Filtration: 25 micron absolute
- Hazardous Location Classification:
  - CSA Class I, Division 2 Groups C & D Temp. Class T5 @ 85° C ambient Temp. Class T3B @ 150° C ambient
  - ATEX Class I, Zone 2 AEx/EX na IIB Temp. Class T5 @ 85° C ambient Temp. Class T3B @ 150° C ambient
- Peak Cylinder Firing Pressure: 2,000 psig (13.8 MPa)

Support Services & Implementation

Typical manufacturing lead times range for standard parts depending on factory workload.

Optional Services

ePCi can be bundled with larger scope emission reduction and reliability improvement projects..

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